PRTS

Process for closing a container and closure for this purpose

Description

The invention relates to a process for closing a container according to the preamble of Claim 1 and to a closure serving for this purpose according to the preamble of Claim 11.

Processes of the type mentioned here are known. If it is intended, for example in a filling plant, for containers such as bottles, canisters or the like to be filled with a liquid and then closed by a closure, then the containers, for this purpose, are first of all removed from a feed device, for example a magazine, and fed to a filling installation by means of a conveying device. In the filling installation, a filling valve, through which the liquid is filled into the container, is lowered over the mouth region of the container. The filled container is then fed to a closing installation, in which the mouth region of the container is closed by a closure which is likewise removed from a magazine and fed via a conveying device. The closure operation takes place in various ways, depending on the design of the closure. Thus, in the case of a metallic closure, a closure blank is fitted onto the mouth region of the container and then, by means of a shaping tool, adapted in shape to the mouth region of the container, whereas, in the case of a plastic closure, the latter, once fitted onto the mouth region of the container, is screwed onto the mouth region by means of a screwing tool.

The process may also be used analogously for the operation of filling containers with granular or pulverulent solids.

Although both the containers and the closures are cleaned and, if appropriate, even disinfected before being introduced into the magazine - or have been cleaned already - the situation where the mouth

region of the container is contaminated by contents during feeding to the filling installation, in particular during the filling operation, or else during feeding to the closure installation or during the closure operation cannot be avoided in the case of the process described. Up until now, between the operations of filling and closing the container, the mouth region of the container has been subjected to a cleaning operation, in the case of which, for example, a flushing-liquid jet is directed onto the mouth region of the container and the latter is possibly then dried by a blowing means or said container is cleaned by means of a brush or a cloth in order to remove the contents deposited there. The disadvantage with this procedure is that droplets of flushing liquid, broken-off bristles from the brush or fluff from the cloth can pass into the interior of the container, thus contaminating the container contents. In the case of granular container contents, this procedure may result in flushing liquid which has penetrated into the mouth region of the container beginning to dissolve the container contents in the mouth region of the container, which results in the container contents forming lumps.

Moreover, the prior art contains a wide range of different closures for containers. In particular, multi-part container closures are also known. Thus, in particular in the case of drinks bottles, use is made of two-part pull-open closures which comprise a sealing sheet stretched over the mouth region of the container as well as an outer closure provided with a pull-open tab. If use is made of these closures for closing containers by the process just discussed, the disadvantages which have already been described arise here as well.

The object of the invention is thus to propose a process for closing a container which allows hygienically satisfactory closure of the container, and

also to develop a closure which is suitable for this purpose.

In order to achieve this object, the invention proposes a process for closing a container by means of a closure which has a closure cap and a sealing device, which comprises a sealing cap. During the operation of closing the container, the mouth region of the container is cleaned between the operations of fitting the sealing cap and fitting the closure cap. The closure cap and the sealing cap, which are separate before the operation of closing the container and are also fitted onto the container in separate process steps, are thus brought together for the first time during the operation of closing the container. First of all the sealing cap is fed to the container and fitted onto the mouth region of the same. Since the sealing cap closes the mouth region of the container, penetration of substances which contaminate the container contents is reliably avoided during the operation of cleaning the container mouth, and the container content thus cannot be adversely affected by the cleaning operation.

A preferred variant makes provision for the mouth region of the container to be cleaned in that it is sprayed, brushed off and/or wiped off. It is possible, moreover, to subject the mouth region to the action of a drying gas. The various possible cleaning methods, individually or in combination, ensure optimum cleaning of the mouth region.

In a preferred variant, provision is made for the closure cap to consist of metal and for the process to comprise fitting of the sealing insert onto the mouth region, cleaning the mouth region, fitting the closure cap onto the mouth region and shaping the closure cap. This variant constitutes the adaptation of the process according to the invention to a metallic closure cap. Following the operations of fitting the sealing cap, cleaning and, if appropriate, drying, a closure-cap blank is fitted onto the mouth region and

is shaped into the finished closure cap. During the shaping operation, for example, the thread of the closure or else grooves are made, the closure being easier to open as a result.

A further preferred variant makes provision for the closure cap to be designed as a screw cap and to consist of plastic and for the process to comprise fitting the sealing insert onto the mouth region, cleaning the mouth region, fitting the closure cap onto the mouth region and screwing the closure cap onto the mouth region. This variant of the process is adapted to the screw cap consisting of plastic. The screw cap is thus already in the finished state before it is fitted onto the mouth region of the container and screwed on.

It is further preferred if - in the case of the metallic closure cap - the sealing insert is fitted by means of a first fitting tool, the mouth region is cleaned by means of a cleaning tool, preferably a flushing nozzle and/or an automatic brush and/or a wiping means, the mouth region is dried by means of a drying tool, preferably a blowing nozzle, the closure cap is fitted by means of a second fitting tool, and the closure cap is shaped by means of a shaping tool, preferably a deep-drawing tool, in particular a plunger and thread rolls. In the case of this variant, all the steps of the process are carried out by means of tools developed for this purpose. The process may thus be carried out in a fully automatically functioning filling line.

In addition, for the case of a plastic closure cap formed as a screw cap, provision is preferably made for a tool also to be used for the operation of screwing the screw cap onto the mouth region. It is thus also possible for plastic screw caps to be fitted in a fully automatic filling line.

In order to achieve said object, the invention also proposes a closure in the case of which the sealing insert is designed as a sealing cap and has at least one retaining means interacting with the

container. Designing the sealing insert as the sealing cap requires it to be adapted in size to the mouth region of the container, that is to say the dimensions of the sealing insert are selected such that, following the operation of fitting the sealing insert onto the mouth region of the container, the latter is closed and the sealing insert or the sealing cap is retained securely. The term "sealing cap" indicates that the sealing insert itself assumes properties of a closure cap, namely the closure property. The retaining means, which interacts in particular with the mouth region of the container, allows the sealing insert to be supported in the mouth region, that is to say slipping of the sealing insert when subjected to the action of pressure from the inside or from the outside is avoided. Being subjected to the action of pressure may be brought about, inter alia, by being cleaned by being sprayed with the cleaning liquid or being dried by being subjected to the action of the cleaning gas flowing out of a blowing nozzle. In both cases, the sealing insert is retained securely in the mouth region of the container.

In the case of a preferred exemplary embodiment of the closure, provision is made for the retaining means to be designed as a web which runs all the way around the sealing cap and extends essentially perpendicularly away from the wall of the sealing insert. This design of the retaining means provides the largest possible surface area for the interaction of the sealing cap with the container. In this case, the sealing cap is retained by clamping in the mouth region of the container. Depending on the three-dimensional shape of the sealing cap, this clamping may take place on the inside of the mouth region and on the outside thereof.

Also preferred is an exemplary embodiment of the closure which has a latching means, also referred to as a bead, which is designed as a peripheral protrusion and which can retain the sealing cap. The

latching means makes it possible for the screw cap and the sealing cap to be connected with a form fit during the shaping operation, in the case of the screw cap being metallic, and during the screwing-on operation, in the case of the screw cap being plastic. It is also the case that said connection is not released when the closure is removed by a consumer, that is to say the consumer can remove the closure cap and the sealing cap at the same time from the mouth region of the container. When the container is closed again, the sealing cap is then already integrated firmly in the closure cap.

Furthermore, provision is preferably made for the sealing cap to have a bottom, an encircling wall which extends from the bottom, and a flange which adjoins the wall and is provided with a bent-down border. This configuration of the sealing cap provides further surfaces which can interact with the mouth region of the container. For example, it is possible for the flange to butt against the top side of the mouth region, and for the bent-down border of the flange to butt against the outside of the mouth region, of the container. This configuration of the flange thus further improves the secure retention of the sealing cap in the mouth region, as well as the sealing properties thereof.

Moreover, an exemplary embodiment of a closure in the case of which the bottom of the sealing cap has a first base surface and a second base surface, which extends from the first base surface in an angled manner, is preferred. The bottom of the sealing cap is thus of plate-like design. This has the advantage of it being possible for droplets of the cleaning liquid which collect on the surface of the sealing cap following the cleaning operation to run together, as a result of gravitational force, to the first base surface of the sealing cap and thus to be removed more easily in the case of a possible drying operation.

It is additionally preferred if the bottom is designed as the lateral surface of a truncated cone. The bottom of the sealing cap thus extends in a wedge-like manner into the mouth region of the container. The wedge shape also helps droplets of the cleaning liquid run together.

Finally, an exemplary embodiment of a closure which is distinguished in that the metal of the closure cap is aluminium and the sealing cap consists of plastic is preferred. Furthermore, the sealing cap may consist of a metal, preferably aluminium, coated with a sealing compound. The selection of these materials guarantees straightforward and also inexpensive production of the closure cap and of the sealing cap.

The invention is explained in more detail hereinbelow with reference to a drawing, in which:

Figure 1 shows the mouth region of the container during the operation of fitting the sealing cap, in section;

Figure 2 shows the mouth region during the operation of cleaning the latter by means of a cleaning liquid, in section;

Figure 3 shows the mouth region during the operation of fitting the closure cap, in section; and

Figure 4 shows the mouth region following the operation of screwing on the closure cap, in section.

Figure 1 shows the mouth region 1 of a container 2. The mouth region 1 has an external thread 3 and a peripheral bead 5 arranged therebeneath. A sealing cap 7 comprising a sealing insert is fitted onto the mouth region 1 of the container 2, as is indicated by arrows 9. The sealing cap 7 has a bottom 11, a peripheral wall 13 which extends from the bottom 11, and a flange 15 which adjoins the wall 13. The flange 15 is provided with a bent-down border 17. The bottom 11 of the sealing cap 7 is made up of a first base surface 19 and of a second base surface 21, which extends from the first base surface in an angled

manner. The sealing cap 7 also has, at the bottom end of the peripheral wall 13, a retaining means 25, which is designed in this case as a peripheral web 23.

The retaining means may also be realized by a press fit, that is to say in that the sealing cap 7 is retained securely solely by virtue of its dimensions being coordinated with the mouth region 1. In this case, it is also possible for the web 23 to be dispensed with.

It is also possible for the bottom 11 of the sealing cap 7 to be designed in the form of the lateral surface of a cone or truncated cone. As seen in cross section, it then extends approximately in a wedge-shaped manner into the mouth region 1 of the container 2.

The first base surface 19 of the bottom 11 of that exemplary embodiment of the sealing cap 7 which is illustrated here has, for example, a thickness of approximately 0.5 mm. The thickness of the second base surface 21 of the bottom 11 is approximately 0.4 mm. In the region of the peripheral wall 13, the thickness of the sealing cap 7 is approximately 0.3 mm. In the region where it does not have a bent-down border 17, the flange 15 has a thickness of 0.4 mm, while the thickness is approximately 0.7 mm in the region of the border 17. The peripheral wall 13 and the second base surface 21 of the bottom 11 enclose an angle β of approximately 110°. The angle α between the first base surface 19 and the second base surface 21 of the bottom 11 is approximately 160°.

The exemplary embodiment of the sealing cap 7 of Figure 1 clearly shows which surfaces of the sealing cap 7, apart from the peripheral web 23, interact with the mouth region 1 of the container 2. Thus, with the sealing cap 7 introduced into the mouth region 1 of the container 2 to the full extent, the bent-down border 17 of the flange 15 interacts with an outer surface 27 of the mouth region 1, while the horizontal section of the

flange 15 interacts with a top side 29 of the mouth region 1.

The top border of the sealing cap 7 illustrated in Figure 1 is illustrated differently on the right-hand side and left-hand side. On the right-hand side, it is possible to see that exemplary embodiment of the sealing cap 7 which has been described up until now. A further embodiment is represented on the left-hand side of the sealing cap 7. This further embodiment is distinguished in that the flange 15 merges into a downwardly angled wall region 30a which forms something of a peripheral ring which is of more or less cylindrical design. Said wall region engages over the outside of the mouth region 1 of the container 2 when the sealing cap 7 has been fitted onto the container 2. This results, on the one hand, in the sealing cap 7 being retained firmly on the container and, on the other hand, in an additional sealing surface.

It should also be pointed out here that it is possible for the peripheral flange 15 of the sealing cap also to be designed without a bent-down border 17 and without the downwardly angled wall region 30a, that is to say for it to be designed such that it runs horizontally to the outermost border. It is possible here, in turn, to distinguish between two cases: in the case of a first variant, the flange 15 always remains in the rectilinearly running, horizontal form, that is to say even when the container 2 is later definitively closed by a closure cap, this being discussed in more detail hereinbelow. In the case of a second variant, it is possible, during the operation of fitting the closure cap, for the outermost border region of the flange 15 to be formed onto the outside of the peripheral container wall. Depending on the inner design of the closure cap, it is possible for the bent-down border 17 or else the downwardly angled wall region 30a to be formed here.

It is thus possible for the initially horizontally peripheral flange 15, during the

definitive closure operation, to be shaped, that is to say possibly deep-drawn, in order to form the bent-down border 17 or, in particular, the angled wall region 30a or the peripheral ring.

It can also be seen in Figure 1 that it is possible to provide on the side which is directed away from the interior of the container 2, that is to say on the top side of the sealing cap 7, webs 30b which run from the peripheral wall 13 to the centre line M, which is depicted by dashed lines. The webs, the number of which can be selected freely within wide limits, all converge in the region of the centre line. The width thereof can be selected essentially freely. It is possible for the height of the web 30b to remain essentially the same over the length thereof. In the case of the exemplary embodiment illustrated here, provision is made for the height of the web 30b to decrease in the direction of the centre line M starting from the peripheral wall 13.

The arrangement of the webs 30b may be selected such that in each case two mutually opposite webs are located on an imaginary diameter line of the sealing cap 7. Provision is made here for them to follow an imaginary radius line. For example, six such webs, which are spaced apart from one another at equal distances, are provided.

On the one hand, the webs 30b serve for stiffening the sealing cap 7. On the other hand, however, it is also possible to provide for the sealing cap 7 to be produced from an oxygen-absorbing material, in order to absorb the oxygen present between the closure and contents of the container 2 following the operation of closing the same. This makes it possible to achieve a situation where the contents of the container, for example beer, have/has a better shelf-life. In this case, rather than just serving for stabilizing the sealing cap 7, the webs also serve for introducing additional material into the closure cap, in order to ensure a higher level of oxygen absorption.

Moreover, the oxygen-absorbing surface of the sealing cap 7 is elevated by the webs.

The webs 30b described here may be provided both in the case of a sealing cap 7 which is of the embodiment illustrated on the right-hand side in Figure 1 and in the case of sealing caps which are of the embodiment represented on the side illustrated on the left of the figure.

Figure 2 illustrates the sealing cap 7, which has been introduced into the mouth region 1 of the container 2 to the full extent, during the cleaning operation. The same parts are provided with the same designations as in Figure 1, so you are referred to the relevant description in this respect.

During the operation of fitting the sealing cap 7 onto the mouth region of the container, foam produced during the filling operation or foam formed by the injection of hot water/steam is expelled and the contents are closed off in an air-tight manner. Oxygen is expelled from the interior of the container by way of the foam moving out of the container mouth 1. This is a very desirable effect in particular in the case of the operation of filling beer, because residues of oxygen in the interior of the container 2 adversely effect the shelf-life of the contents or of the beer.

Following the operation of fitting the sealing cap 7, which thus serves as a shaped seal or also as a preliminary closure, and is also referred to in specialist circles as a displacer, the interior of the container is protected against the penetration of oxygen.

Since the sealing cap 7 only closes the uppermost mouth region 1 of the container 2, the container wall is unobstructed and thus easily accessible for a cleaning operation. Contents residues, in particular sugar, may thus be removed easily and virtually without leaving anything behind, with the result that bacteria and, in particular, mould cannot find a breeding ground.

Figure 2 shows a cleaning tool 33 comprising a flushing nozzle 31. The flushing nozzle 31 discharges a cleaning liquid 35 in the form of a jet onto the mouth region 1 of the container 2. It is thus possible for residues of the contents of the container 2 which are located in the mouth region 1 of the container 2, in particular in the region of the external thread 3 and of the peripheral bead 5, to be removed by the cleaning liquid 35 without droplets of the cleaning liquid 35 being able to pass into the interior of the container 2. The cleaning liquid 35 may be water alone or also water with an addition of detergent or disinfectant.

Instead of carrying out the cleaning operation with a cleaning liquid 35, the mouth region of the container may be brushed off by means of a brush (not illustrated) or wiped off by means of a wiping means (not illustrated either). Of course, it is also possible for the methods of cleaning cited to be combined with one another.

Figure 2 shows a flushing nozzle 31 by means of which, by way of example, the mouth region 1 which is to be cleaned is sprayed with a cleaning liquid from above. It is also conceivable to provide a flushing nozzle which sprays the container with cleaning liquid from the side, in particular in the top region in the vicinity of the sealing cap 7. Adhering contents, in particular sugar and the like, can be removed particularly effectively using this flushing direction. At the same time, it is possible for a special blowing head to be lowered onto the sealing cap from above, said blowing head blowing out, or flushing out with liquid, contamination which is present on the top side of the sealing cap. In this case, the blowing head presses the sealing cap 7 onto the mouth region 1, with the result that, even in the case of a very strong flushing jet, the situation where the sealing cap is accidentally lifted off is reliably avoided.

Following the cleaning step, it is possible for a drying step (not illustrated in the drawing) to take place, in the case of which a blowing-nozzle-containing drying tool blows a drying gas onto the mouth region of the container 2, as a result of which the droplets of cleaning liquid 35 which are still adhering to the mouth region 1 of the container 2 or to the sealing cap 7 are removed from the mouth region 1. An example of the possible drying gas is air. The drying operation may also take place in some other suitable manner, for example by means of heat radiation and/or a drying agent.

The cleaning action of the cleaning liquid 35 and the drying action of the drying gas may be enhanced by the cleaning liquid and the drying gas being heated before being applied to the mouth region 1.

Figure 2 also clearly shows how the sealing insert 7 is supported with clamping action by the retaining means 25, in this case by the web 23, in the mouth region 1 of the container 2. This clamping action can be further enhanced, in the case of a somewhat longer peripheral web 23, by a compression extending over the entire thickness of said web.

Not illustrated in the drawing is an exemplary embodiment of the sealing cap 7 in the case of which the bottom of the sealing cap, rather than being located in the mouth region 1 of the container 2, extends essentially above said region. In the case of this exemplary embodiment, the peripheral web is arranged such that it subjects the outside of the mouth region 1 to a clamping action. In this case too, it is possible for the web to be replaced by a press fit between the sealing cap and outside. Of course, it is possible for sealing caps to be designed such that webs are provided on the inside and on the outside, a press fit is provided on the inside and on the outside, or that a web is provided on one side - on the inside or outside - and a press fit is provided on the other side - on the outside or inside.

Figure 3 shows the mouth region 1 of the container 2 with the sealing cap 7 located therein, and serving as a sealing insert, during the operation of fitting a screw cap 37, which is illustrated symbolically by arrows 39. The same parts are provided with the same designations as in Figures 1 and 2, so you can refer once again to the relevant description in this respect. Not yet present in Figure 3 is a retaining means, or internal thread 41, which is located in the interior of the closure cap 37 and, following the operation of closing the container, is in engagement with the external thread 3 of the mouth region 1. In contrast, Figure 3 clearly shows a tamper-proof band 43 which, following the closure operation, is adapted in shape to the peripheral bead 5 of the mouth region 1.

Figure 4 shows the mouth region 1 of the container 2 with the sealing cap 7 and the closure cap 37 once the container 2 has been closed by the closure cap 37. Once again, the same parts are provided with the same designations as in Figures 1 to 3, so you are referred to the relevant description.

It is clearly shown how, with the container 2 closed, the external thread 3 of the mouth region 1 interacts with the internal thread 41 of the closure cap 37, which is designed in this case as a screw cap, and the peripheral bead 5 of the mouth region 1 interacts with the tamper-proof band 43 of the closure cap 37.

Also clearly visible in Figure 4 is a latching means 47 which is designed as a protrusion 45 running round at least in certain areas. Running round in certain areas here means that the protrusion may be made up of a multiplicity of individual lug-like protrusions. The latching means 47 serves for producing a form-fitting or force-fitting connection between the sealing cap 7 and the closure cap 37 during the operation of closing the container 2. If the container 2 is opened by a consumer, that is to say if the

closure cap 37, which is designed as a screw cap, is unscrewed from the mouth region 1 of the container 2, then the latching means 47 of the closure cap 37 is connected to the border 17 of the sealing cap 7 such that it is carried along. The force applied to the screw cap 37 by the consumer is thus transmitted to the sealing cap 7 via the latching means 47 and the border 17 of the flange 15. Since this force in each case is greater than that force by means of which the encircling web 23 is supported in the mouth region 1 of the container 2, it is ensured that the sealing cap 7 is removed from the mouth region 1 of the container 2 preferably always together with the closure cap 37. If the consumer closes the container 2 again, then the closure cap 37 and the sealing cap 7 are fitted or screwed onto the mouth region 1 of the container 2 together. The sealing action of the sealing cap 7 is maintained even after the container 2 has been opened and closed a number of times.

Depending on whether the closure cap consists of metal or plastic, that state of the container 2 which is illustrated in Figure 4 is produced in two different ways. In the case of a closure cap made of metal, a cap blank is fitted onto the mouth region 1 of the container 2, which still does not have any internal thread 41. The latter is produced for the first time by the cap blank being worked by means of a shaping tool: first of all, however, the transition region between the lateral surface of the cap blank and the bottom which closes the mouth of the container 2 is usually deep-drawn, in order for the sealing insert or the sealing cap to be pressed with sealing action against the container. The lateral surface is then pressed, by means of a suitable pressure-exerting roll, against the mouth region 1, in particular against the external thread 3 thereof, as a result of which the internal thread 41 is formed. In contrast, in the case of a closure cap consisting of plastic, rather than a blank, the already formed closure cap is fitted. The plastic

closure cap thus already comprises the internal thread, with the result that all that is required for the operation of closing the container is to screw on the closure cap.

In order to simplify matters, with the exception of the cleaning tool 33 in Figure 2, the drawing does not illustrate any of the tools which carry out the individual steps of the closing process, that is to say the fitting tools, the drying tool, the shaping tool and the screwing-on tool. The second fitting tool which is used in practice here is a closing head or magnetic closing head having a conventional cap shoe.

The above description is based on the closure being of two-part design and having a closure cap and a sealing cap. It is thus a decisive factor that the closure is in two parts, this making it possible for a container to be closed provisionally by means of the sealing cap following the filling operation in order that a cleaning operation can be carried out without contents of the container being adversely affected. This results in it being possible for contents residues to be removed from the mouth region of the container and for the attack by bacteria and the like thus to be reduced or avoided altogether. Following the cleaning operation, the container is then closed off definitively by means of the closure cap.

Up until now, it has been assumed that the closure cap is designed as a closure-cap blank which is then shaped into a screw closure in a shaping operation. It is also possible for a finished screw closure, in particular made of plastic, to be fitted or screwed onto a container closed by a sealing cap.

It should also be pointed out here expressly, however, that the closure cap may also be designed as a crown cap which, following the provisional closure of the container and a cleaning operation, is fitted or pressed onto the container and/or the sealing cap and is formed onto the mouth region of the container, and

is thus retained securely, if appropriate using a suitable shaping tool.

Use may be made here not just of conventional crown caps but also so-called rotary crown caps which, following the conventional closing and forming-on operations, can be unscrewed from the container or the mouth region thereof. In the latter case, the outside of the container, of course, has to be provided with a thread or with a groove formation acting as a thread.

The types of closure cap cited here are only given by way of example. It is, of course, also conceivable for the sealing cap 7, which acts as a preliminary closure or shaped seal, to be combined with differently designed closure caps, for example also with so-called twist-off closure caps. The essential factor is that, overall, the closure is designed with at least two parts and the sealing cap or the preliminary closure closes the container first of all in an air-tight manner and the closure cap then closes off the container definitively, it then being possible for the specific configuration of the closure cap to be selected freely in this context.

The sealing cap 7 may then be adapted in configuration to the different types of closure cap. In the case of rotary crown caps, for example, it is conceivable for the sealing cap, as has been explained with reference to Figure 1, to be formed onto the outer wall region of the container 2 by the closure cap and thus to extend over a relatively large region of the outer wall, as has been explained, for example, with reference to the downwardly angled wall region 30a. In this case, the sealing cap may be provided with a thread, which then engages with an external thread of the container. Moreover, it is also possible merely to provide thread turns on the outer wall of the container and to press the sealing cap against these, during the closure operation, such that, in the region of the contact with the thread turns on the container,

corresponding thread turns are then made in the plastic of the sealing cap.

It is the common feature of all the types of closure that, following completion of the closing operation, the initially two-part closure may preferably be handled as a unit, that is to say, following the operation of fitting the closure cap, the sealing cap latches into the interior of said closure cap because, as has been described, for example, with reference to Figure 4, latching means 47 are provided there and these, following operation of fitting the closure cap, retain the sealing cap securely. In the case of all the types of closure described here, it is thus possible, on account of the closure being in two parts, for a cleaning operation to be carried out, following the filling operation and the provisional closure of the container by means of the sealing cap, and then for the container to be closed definitively for the first time by means of the closure cap, which, as has been said, may be of any desired design.

During the operation of fitting the closure cap, the outer border of the sealing cap is pressed against the wall of the container, and forms thereon, with the result that the container is closed off in a pressure-tight manner. This applies to both embodiments of the sealing cap which has been explained with reference to Figure 1 and to all the variants of the closure cap which have been described here.

The sealing cap preferably consists of plastic, combined forms, in which the sealing cap may consist of a metal base coated with plastic, also being possible. The sealing cap may also be made up of more than two materials. In particular in the case of all-plastic sealing caps, the plastic achieves the situation where, in the case of screw closures, the opening forces are reduced to a reasonable level on account of the sliding capacity of plastic, that is to say the opening forces can be adjusted relatively well to small values on account of the sliding capacity, with the result that

no problems arise when the container is opened by the consumer. Moreover, in the case of the selection of the material of the sealing cap, it is also possible to use oxygen-absorbing plastic or a barrier material, with the result that the shelf-life of the contents present in the container is increased.

By virtue of a suitable selection of the plastic for the sealing cap, it is possible to ensure that the sealing action of the closure remains essentially constant even when the container is opened and closed a number of times, with the result that it is also possible to achieve a high level of reliability. On the one hand, the container can be closed to good effect in order to avoid the contents perishing and, on the other hand, by virtue of the specific design of the sealing cap and of the closure cap, excess-pressure limitation can be ensured, and maintained, even when the closure is opened and closed a number of times.

Finally, all that remains to point out is that the process described and the closure cap illustrated can be used for both disposable and reusable containers. If the container 2 is sent back to the manufacturer together with the screw cap and the sealing insert located therein, then the manufacturer can even separate the closure cap and the sealing insert or the sealing cap from one another again by using suitable tools. In particular, it is readily possible for these two parts to be fed separately to a recycling process.

When the closure described is used, the process described allows hygienically satisfactory closure of a container. This is possible in that the closure comprises a closure cap and a sealing insert which is formed separately and can be handled separately, the mouth region of the container being cleaned between the operations of fitting the sealing insert and fitting the closure cap.